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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/000,323	12/04/2001	Masayuki Mishima	Q67519	9759

7590 08/08/2003
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EXAMINER

COLON, GERMAN

ART UNIT PAPER NUMBER

2879

DATE MAILED: 08/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/000,323

Applicant(s)

MISHIMA, MASAYUKI

Examiner

German Colón

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The Amendment, filed on May 21, 2003, has been entered and acknowledged by the Examiner.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moriyama et al. (US 2002/0068192) in view of Tsai et al. (US 6,566,805).

Regarding claim 1, Moriyama discloses a method of producing a light-emitting device comprising the steps of disposing a transparent electrode **2**, one or more organic layers **3** and a back side electrode **5** on a substrate **1** to provide a light-emitting structure, and disposing sealing parts **6** on said light-emitting structure to isolate said one or more organic layers from external air, wherein said one or more organic layers comprises a light-emitting layer **3** containing a phosphorescent compound (see paragraph [0048]), and said light-emitting layer, said back side electrode and said sealing parts are disposed in an inert gas atmosphere (see paragraph [0058]). Moriyama teaches the detrimental effects caused by moisture and oxygen to the OLED (see paragraphs [0019] and [0020]) but is silent regarding their concentrations within the sealed atmosphere.

However, in the same field of endeavor, Tsai teaches that in order to avoid the adverse effects of oxygen and moisture in an OLED, such as peeling off or degeneration of the electrode layers resulting in dark spots and decrease in the lifetime of the device (see Col. 2, lines 6-19, and Col. 3, lines 1-7), the required content of oxygen and water (moisture) should be no more than 1 ppm (see Col. 3, lines 9-10). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the OLED of Moriyama with a moisture and oxygen content of no more than 1 ppm, with the purpose of avoiding the adverse effects of oxygen and moisture in an OLED, such as peeling off or degeneration of the electrode layers resulting in dark spots and decrease in the lifetime of the device.

Regarding claim 2, Moriyama discloses said one or more organic layers being isolated from external air after disposing said one or more organic layers until said sealing parts are disposed (see paragraph [0071] and [0082]).

Regarding claims 3 and 4, Moriyama-Tsai discloses both of said moisture concentration and said oxygen concentration being 1 ppm or less.

Referring to claim 5, Moriyama discloses at least one of said organic layers being formed by a wet film-forming method (see paragraph [0047], lines 9-10).

Referring to claim 6, Moriyama discloses said one or more organic layers comprising a hole-injecting layer in contact with said light-emitting layer and said hole-injecting layer over said transparent electrode (see paragraph [0047], lines 3-9).

Referring to claim 7, Moriyama discloses at least both of said hole-injecting layer and said light-emitting layer being formed by a wet film-forming method (see paragraph [0047], lines 6-8 in view of lines 9-10).

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Regarding claim 8, Moriyama discloses said one or more organic layers further comprising an electron-transporting layer between said light-emitting layer and said back side electrode (see paragraph [0047], lines 3-9).

Regarding claim 9, Moriyama discloses a weight ratio of said phosphorescent compound in said light-emitting layer being in a range of 0.1 to 70 wt% (see paragraph [0066] lines 4-5).

Regarding claim 10, Moriyama discloses said phosphorescent compound being an ortho-metallation complex (see paragraph [0048], lines 5-8, and paragraph [0066], line 4).

Regarding claim 11, Moriyama discloses an UV-hardening resin being used in combination with said sealing parts to isolate said one or more organic layers from external air (see paragraph [0056] lines 4-5).

Referring to claim 12, Moriyama-Tsai discloses a light-emitting device comprising a transparent electrode 2, one or more organic layers 3 and a back side electrode 5 on a substrate 1 to provide a light-emitting structure, and disposing sealing parts 6 on said light-emitting structure to isolate said one or more organic layers from external air, wherein said one or more organic layers comprises a light-emitting layer 3 containing a phosphorescent compound (see paragraph [0048]), and said light-emitting layer, said back side electrode and said sealing parts are disposed in an inert gas atmosphere (see paragraph [0058]) where both a moisture concentration and an oxygen concentration are 1 ppm or less. Same reasons for combining stated in claim 1 apply.

Referring to claim 13, Moriyama discloses said one or more organic layers being isolated from external air after disposing said one or more organic layers until said sealing parts are disposed (see paragraph [0071] and [0082]).

Referring to claims 14 and 15, Moriyama-Tsai discloses both of said moisture concentration and said oxygen concentration being 1 ppm or less.

Referring to claim 16, Moriyama discloses at least one of said organic layers being formed by a wet film-forming method (see paragraph [0047], lines 9-10).

Referring to claim 17, Moriyama discloses said one or more organic layers comprising a hole-injecting layer in contact with said light-emitting layer and said hole-injecting layer over said transparent electrode (see paragraph [0047], lines 3-9).

Regarding claim 18, Moriyama discloses at least both of said hole-injecting layer and said light-emitting layer being formed by a wet film-forming method (see paragraph [0047], lines 6-8 in view of lines 9-10).

Regarding claim 19, Moriyama discloses said one or more organic layers further comprising an electron-transporting layer between said light-emitting layer and said back side electrode (see paragraph [0047], lines 3-9).

Regarding claim 20, Moriyama discloses a weight ratio of said phosphorescent compound in said light-emitting layer being in a range of 0.1 to 70 wt% (see paragraph [0066] lines 4-5).

4. Claims 1, 3, 4-12, and 14-20 rejected under 35 U.S.C. 103(a) as being unpatentable over Baldo et al. (US 6,097,147) in view of Yasukawa et al. (US 6,268,071), further in view of Tsai et al. (US 6,566,805).

Regarding claim 1, Baldo discloses a method of producing a light-emitting device (see Fig. 3) comprising the steps of disposing a transparent electrode 511, one or more organic layers

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512-515 and a back side electrode **516** on a substrate **510** to provide a light-emitting structure, wherein said one or more organic layers comprises a light-emitting layer **513** containing a phosphorescent compound. Baldo is silent regarding the limitation of “disposing sealing parts to isolate said one or more organic layers from external air, wherein said sealing parts are disposed in an inert gas atmosphere where both of a moisture concentration and oxygen concentration are 100 ppm or less”.

However, in the same field of endeavor, Yasukawa discloses an OLED comprising sealing parts to isolate the organic layers from external air (see Fig. 1), because OLEDs are acutely sensitive to moisture which causes degeneration of the electrodes resulting in non-light emission spots (see Col. 1, lines 23-29). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the sealing parts disclosed by Yasukawa to the light-emitting device of Baldo, in order to avoid exposure of the OLED to moisture which causes degeneration of the electrodes resulting in non-light emission spots.

Baldo-Yasukawa discloses a light-emitting device having a light-emitting structure enclosed by sealing parts in an inert gas atmosphere. Yasukawa teaches said inert gas atmosphere having a moisture content of 100 ppm or lower, and especially 1 ppm or lower (see Col. 8, lines 63-67). Yasukawa discloses the desirability of avoiding penetration of oxygen to the light-emitting structure (see Col. 8, lines 13-14) but is silent regarding the preferred concentration of oxygen within the sealed atmosphere.

However, in the same field of endeavor, Tsai teaches that in order to avoid the adverse effects of oxygen and moisture in an OLED, which deteriorate the performance and decrease the lifetime of the device (see Col. 2, lines 6-19, and Col. 3, lines 1-7), the required content of both

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oxygen and water (moisture) should be no more than 1 ppm (see Col. 3, lines 9-10). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the OLED of Baldo-Yasukawa with an oxygen content of not more than 1 ppm, to avoid the adverse effects of oxygen which deteriorates the performance and decreases the lifetime of the device.

Regarding claims 3 and 4, Baldo-Yasukawa-Tsai discloses both the moisture concentration and the oxygen concentration being 1 ppm or less.

Regarding claim 5, Baldo discloses the at least one of said organic layers being formed by a wet film-forming method (see Col. 5, lines 49-51).

Regarding claim 6, Baldo discloses said one or more organic layers comprising a hole-injecting layer in contact with said light-emitting layer and said hole-injecting layer over said transparent electrode (see Fig. 3).

Referring to claim 7, Baldo discloses at least both of said hole-injecting layer and said light-emitting layer being formed by a wet film-forming method (see Col. 5, lines 49-51).

Referring to claim 8, Baldo discloses said one or more organic layers further comprising an electron-transporting layer between said light-emitting layer and said back side electrode (see Fig. 3).

Referring to claim 9, Baldo discloses a weight ratio of said phosphorescent compound in said light-emitting layer being in a range of 0.1 to 70 wt% (see Col. 6, line 11).

Referring to claim 10, Baldo discloses said phosphorescent compound being an ortho-metallation complex (see Col. 6, line 11).

Regarding claim 11, Baldo-Yasukawa-Tsai discloses an UV-hardening resin being used in combination with said sealing parts to isolate said one or more organic layers from external air (see '071, Col. 3, line 64 to Col. 4, line 3).

Regarding claim 12, Baldo-Yasukawa-Tsai discloses a light-emitting device comprising a transparent electrode **511**, one or more organic layers **512-515** and a back side electrode **516** on a substrate **510** to provide a light-emitting structure, wherein said one or more organic layers comprises a light-emitting layer **513** containing a phosphorescent compound; sealing parts to isolate the organic layers from external air (see Fig. 1 of '071); wherein said light-emitting structure and said sealing parts are disposed in an inert gas atmosphere where both a moisture concentration and an oxygen concentration are 1 ppm or less. Same reasons for combining stated in claim 1 apply.

Regarding claims 14 and 15, claims 14 and 15 are rejected over the reasons stated in the rejection of claims 3 and 4, respectively.

Referring to claims 16-20, claims 16, 17, 18, 19 and 20 are rejected over the reasons stated in the rejection of claims 5, 6, 7, 8, and 9, respectively.

Response to Arguments

5. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

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Prior Art of Record

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Thompson et al., in U.S. Patent No. 6,303,238, discloses a luminescent element comprising an ortho-metallation compound having platinum and porphyrin.

Kwong et al., in US 2003/0072964, discloses phosphorescent compounds comprising organometallic complexes.

Contact Information

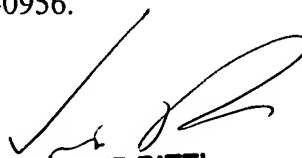
Any inquiry concerning this communication or earlier communications from the examiner should be directed to German Colón whose telephone number is 703-305-5987. The examiner can normally be reached on Monday thru Friday, from 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on 703-305-4794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7382 for regular communications and 703-308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

AC
gc

July 29, 2003


VIP PATEL
PRIMARY EXAMINER